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Application No.: 10/718,897

Docket No.: JCLA11797

REMARKS**Present Status of the Application**

The Office Action rejected claims 15-20. Specifically, the Office Action rejected claims 15-20 under 35 U.S.C. 102(e), as being anticipated by Maiz et al. (U.S. 6,794,755). The Office Action rejected claims 15-17 under 35 U.S.C. 102(e), as being anticipated by Morrow et al. (U.S. 2004/0058547). The Office Action rejected claims 18-20 under 35 U.S.C. 103(a) as being unpatentable over Maiz in view of Morrow.

Applicants have amended claim 15 to overcome the rejection and added claims 21-23. The limitations added in claims 15, 22 are described in paragraph [0020] and no new matter is entered. After entry of the foregoing amendments, claims 15-23 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Office Action Rejections

Applicants respectfully traverse the 102(e) rejection of claims 15-20 because Maiz et al. (U.S. 6,794,755) does not teach every element recited in these claims.

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8th ed., 2001.

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The present invention is in general related a structure of metal interconnects as claim 15 recites:

Claim 15. A structure of metal interconnects, comprising:
a first dielectric layer, having a first opening therein;
a first metal layer, formed in the first opening; and
a first protective layer, formed on the surface of the first metal layer not covered by the first dielectric layer, *wherein the first protective layer is formed from a mixture of the first metal layer and a first film layer, and the first film layer is reactive with the first metal layer but non-reactive with the first dielectric layer.*

Maiz fails to teach or suggest that the feature of the first protective layer is formed from a mixture of the first metal layer and a first film layer, and the first film layer is reactive with the first metal layer but non-reactive with the first dielectric layer. In Maiz's reference, the copper alloy layer 216 on the copper interconnect 224 and the mixture layer 218 on the ILD layer 210 is formed by an ion implantation procedure with a metal material 211 (col. 3, lines 53-60). The thermal treatment may encourage the implanted treatment metal 211 to draw oxygen from the ILD 210 and to oxidize the ILD mixture 212. The ILD mixture 212 is converted into a mixture 218 (ILD metal-oxide mixture) (col. 6, lines 45-49). Hence, the layer 211 formed on the interconnect 224 and the ILD layer 210 is a metal layer, and the metal material 211 is reactive with the ILD 210. However, in claim 15 of the present invention, the first protective layer is formed from a mixture of the first metal layer and a first film layer, and the first film layer is reactive with the first metal layer *but non-reactive with the first dielectric layer*. Hence, Maiz fails to teach or disclose each and every element of claim 15.

For at least the foregoing reasons, Applicant respectfully submits that independent claim 15 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 16-20 patently define over the prior art as well.

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Applicants respectfully traverse the 102(e) rejection of claims 15-17 because Morrow et al. (U.S. 2004/0058547) does not teach every element recited in these claims.

Morrow also fails to teach or suggest that the feature of the first protective layer is formed from a mixture of the first metal layer and a first film layer, and the first film layer is reactive with the first metal layer but non-reactive with the first dielectric layer. In Morrow's reference, a metal material 226 is formed onto the ILD 210 and the interconnect 224 (paragraph [0017]). The metal material 226 may comprise a material that will automatically react with the exposed upper portion of the ILD 210 as the metal material 226 is being deposited to form a metal oxide layer 228 (paragraph [0019]). In other words, the material 226 formed on the interconnect 224 and the ILD 210 is a metal layer, and the metal material 226 is reactive with the ILD 210. However, in claim 15 of the present invention, the first protective layer is formed from a mixture of the first metal layer and a first film layer, and the first film layer is reactive with the first metal layer *but non-reactive with the first dielectric layer*. Hence, Morrow also fails to teach or disclose each and every element of claim 15.

For at least the foregoing reasons, Applicant respectfully submits that independent claim 15 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 16-17 patently define over the prior art as well.

The Office Action rejected claims 18-20 under 103(a) as being unpatentable over Maiz in view of Morrow. Applicants respectfully traverse the rejection for at least the reasons set forth below.

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Applicants submit that, as disclosed above, Maiz and Morrow fail to teach or suggest each and every element of claim 15, from which claims 18-20 depend. Because independent claim 15 patently defines over the prior art references, and should be allowed, its dependent claims 18-20 patently define over the prior art as well.

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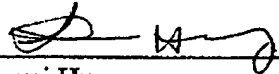
CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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